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NOTES ON VOLES (*MICROTUS*, FAMILY CRICETIDAE) IN NEW MEXICO

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INTRODUCTION

Five species of voles of the genus *Microtus* are known from New Mexico, these being the meadow vole (*M. pennsylvanicus*), montane vole (*M. montanus*), Mexican vole (*M. mexicanus*), long-tailed vole (*M. longicaudus*), and prairie vole (*M. ochrogaster*). Distributional and related data on these species in the state have been presented by various workers, most extensively by Findley *et al.* (1975). However, new data have come to light in recent years and are presented in this paper. Much of this new information is the result of surveys by the New Mexico Department of Game and Fish, and the specimens cited are in the Departmental collection (NMGF) unless otherwise noted.

SPECIES ACCOUNTS

***Microtus pennsylvanicus* (Ord.)**

Findley *et al.* (1975) map this species mainly in northern New Mexico (San Juan, Taos, Mora, Colfax, Santa Fe, and San Miguel counties), with outlying populations in Valencia (=Cibola) and Catron counties. It is particularly the latter two populations that have been of interest to us, as their existence has not been confirmed since early in this century. Studies of older

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material (Anderson 1961; Anderson and Hubbard 1971) indicate that neither population is subspecifically distinct, but some differentiation has occurred in them and their relictual nature makes them of interest and concern.

The Cibola County population was reported by Bailey (1932) as *M. p. modestus* (Baird), from the San Rafael area. Three specimens verifying the existence of this population are at the National Museum of Natural History (Biological Survey Collection), according to Findley *et al.* (1975).

Our attempts to relocate this population of *M. pennsylvanicus* have been thwarted by the loss of habitat in the San Rafael vicinity, namely the eradication of the marshes in which the species was originally found. Marshes do remain somewhat to the northeast, along Interstate Highway 40 east of Grants. We trapped in that area in July 1977, but we failed to find *M. pennsylvanicus* there — nor did Bruce Hayward find it in 1979. We suspect that this population is extinct.

The Catron County population of *M. pennsylvanicus* is known from a series of specimens taken in 1915 by J. Stokley Ligon in the Tularosa Valley, seven to eight miles (11-13 km) southwest of Aragon. Five specimens from this series have previously been reported by Anderson (1961), Anderson and Hubbard (1971), and Findley *et al.* (1975), these being housed at the American Museum of Natural History and the San Diego Museum of Natural History. To these may be added two additional Ligon specimens, both at Yale Peabody Museum: adult male (YPM 2034), 15 February 1915, and adult female (YPM 2035), 16 February 1915; both were taken eight miles southwest of Aragon.

Our attempts to relocate the Catron County population of *M. pennsylvanicus* have been confined to the upper San Francisco Basin, including the drainages of Tularosa Creek (especially near Aragon and at Tularosa Marsh), Apache Creek (Fitzgerald Cienaga), and Centerfire Creek (Centerfire Bog). To date, we have not found *M. pennsylvanicus* in the area, and we are tempted to agree with others (e.g. Anderson and Hubbard 1971, Findley *et al.* 1975) that the population there may be extinct.

In addition to our efforts in Catron County, others have sought *M. pennsylvanicus* there without success. For example, both Sydney Anderson and Bruce Hayward (*pers. comm.*) have trapped in the Tularosa Creek area, taking only *M. mexicanus* there. J. S. Ligon also took the latter species there in 1915, along with the aforementioned specimens of *M. pennsylvanicus*. More recently, Krausman and Bahti (1980) reported having taken *M. pennsylvanicus* at nearby Centerfire Bog, some 24 km northwest of the Ligon locality. However, their specimen (NMGF 647), an adult female taken on 13 August 1978, is clearly *M. mexicanus* in skull characters, color, and tail length (standard measurements 140-28-20-15 mm).

In addition to our searches for *M. pennsylvanicus* in Cibola and Catron counties, we have also sought the species in other parts of New Mexico, particularly in the northeastern third of the state. There we found it in several areas not recorded by Findley *et al.* (1975), the most notable being in Union

County, where six specimens were taken along Pinabete Creek, 1.5 km north and 8 km west of Des Moines on 7 March 1978. We have also taken numerous specimens at new localities between Union County and the foothills of the Rocky Mountains, in Colfax County (Stubblefield Lake; Cimarron River, 0.8 km south of Springer; UU Bar Ranch, 1.5 km east of Miami Lake), in Mora County (Watrous area; Cherry Lake), and in San Miguel County (McAllister Lake) — all in the period 6 May 1977 to 23 March 1978.

Findley *et al.* (1975) and earlier workers have pointed out the association of this vole with mesic habitats in New Mexico, and our data generally support this contention. This is particularly evident in the San Juan Valley, in northwestern New Mexico, where Schmitt collected numerous specimens from areas dominated by grasses, sedges, rushes (*Juncus*), and similar growth — typically in wet or very wet sites.

In northeastern New Mexico, we found *M. pennsylvanicus* in a somewhat broader array of habitats. These ranged from dense stands of graminoids and forbs along Interstate Highway 25 (Watrous area) to very wet areas of sedges (e.g. Stubblefield Lake) and periodically inundated areas of *Juncus* (e.g. McAllister Lake). In general, we found that broader habitat usage occurred in *M. pennsylvanicus* where it was the only *Microtus* found. Where other species occurred, we found *M. pennsylvanicus* at the most mesic end of the habitat spectrum. For example, *M. pennsylvanicus* and *M. ochrogaster* were found in close proximity near Miami Lake. There the former was taken in runways at the edge of a live stream in stands of *Juncus*, while *M. ochrogaster* was taken in adjacent dense grass. However, at Springer and Wagon Mound, where the two species also occur together, we found both in mesic habitats. *M. pennsylvanicus* also occurs in close proximity to *M. mexicanus* in northeastern New Mexico, although we have not taken them together (also see *M. ochrogaster* account).

In general, we find that our specimens of *M. pennsylvanicus* from northeastern New Mexico closely resemble those of the San Juan Valley in color and size. Hence, we follow Anderson and Hubbard (1971) in including both populations in the race *M. p. modestus* (Baird). Interestingly, six (16.2%) of the 38 specimens in our series from the San Juan Valley have the posterior loop on M2 obsolete or reduced. By contrast, all of our specimens from northeastern New Mexico showed this loop to be discrete, if not well-developed.

***Microtus montanus* (Peale)**

Our surveys in southwestern New Mexico revealed the presence of this species in Catron County at Centerfire Bog. There, Marshall Conway took a total of 10 specimens on 27 June and 21 October 1978 and 12 April 1979. We have assigned these specimens to *M. m. arizonensis* Bailey, and this represents the first unequivocal record of this form to be published for New Mexico.

Bailey (1932) records this race of *M. montanus* from the Jemez and Zuni mountains, based on single specimens; however, these were subsequently reallocated by Anderson (1959) to *M. longicaudus*. The reallocation of the Zuni Mountains record is regarded as questionable by Don Wilson (*in litt.*), and the specimen — a juvenile taken in 1874 by H. W. Henshaw and now preserved at the U. S. National Museum of Natural History — may never be properly allocated to species. Certainly, even if it were *M. montanus*, it could not be confidently identified subspecifically. With regard to the Jemez Mountains, *M. montanus* does occur there, Bailey's misidentification notwithstanding. That population, and others in northern New Mexico, have been assigned by Anderson (1959) to *M. m. fusus* Hall.

The generally accepted range of *M. m. arizonensis* is in the White and Blue mountains of Arizona and their vicinity (Cockrum 1960). Centerfire Bog is less than 35 km east of the nearest Arizona locality, and therefore the occurrence of this vole in New Mexico is not unexpected. The New Mexican population occurs in a wet sedge and grass meadow (elevation ca. 2100 m), bordering marshes and open water. Because of the restricted range and vulnerability of its habitat, *M. m. arizonensis* was listed as endangered in New Mexico in 1979 (Game Commission Regulation No. 599) and again in 1983 (Regulation No. 624).

We have not found *M. montanus* otherwise outside the range outlined by Findley *et al.* (1975), but Dalquest (1975) reported the species from Colfax and Union counties in northeastern New Mexico. However, our examination of his material shows all of his specimens to be *M. mexicanus* (see below).

***Microtus mexicanus* (Saussure)**

Findley *et al.* (1975) map this species in New Mexico primarily in the southern highlands, north to McKinley and Valencia (=Cibola) counties (Zuni Mountains and the Mt. Taylor range) and Bernalillo County (Sandia Mountains). However, the species is known to range north to southern Utah and southwestern Colorado (Hall 1981), and we here report it farther northeast as well, i.e. in Colfax and Union counties.

As noted in our discussion of *M. montanus*, Dalquest (1975) erroneously reported as that species a series of *M. mexicanus* taken in northeasternmost New Mexico. These specimens, housed at Midwestern University, Wichita Falls, Texas, and kindly lent to us by Dalquest, were taken at Raton Pass, Colfax County, and near Capulin Mountain National Monument, Union County, in August 1966. They clearly represent *M. mexicanus*, as Dalquest (*in litt.*) now agrees. Dalquest (1975) found numerous vole runways on the Colorado side of Raton Pass, and he surmised that *M. "montanus"* (= *mexicanus*) would also be found in that area of the state. Armstrong (1972) does not record *M. mexicanus* from southeastern Colorado.

M. mexicanus was also taken at Capulin Mountain National Monument by A. L. Gennaro and his associates in 1975, 1976, and 1977 (Eastern New

Mexico Museum of Natural History collection). In addition, we have taken specimens on nearby Sierra Grande in the period from 1976 to 1982. Finally, Donald Hoffmeister (*in litt.*) reports *M. mexicanus* as having been taken by Woodrow Goodpaster south of Cimarron, Colfax County, in 1975. These records extend the range of this species some 180 to 280 km northeast of the Sandia Mountains, the previous northeasternmost known area of occurrence in the state. Whether these occurrences in northeastern New Mexico represent a recent range extension or are the result of past oversight, we cannot say. *M. mexicanus* is now also frequent in the Sandia and Manzano mountains, where previously rare or not found at all (Findley *et al.* 1975).

Another somewhat unexpected record of *M. mexicanus* is from the marshes east of Grants, Cibola County, where we took two specimens on 7 July 1977. Hayward also took specimens of *M. mexicanus* there in 1979, and these are housed at Western New Mexico University. Findley *et al.* (1975) recorded the species in that region of the state only in montane areas, except possibly for a series in the American Museum of Natural History labelled as Thoreau, McKinley County. However, this series is probably actually from Cottonwood Gulch, a montane area, to the south in the Zuni Mountains (D.A. McCallum *pers. comm.*).

In our experience, *M. mexicanus* occurs in a wide variety of habitats in New Mexico, from fairly dry montane meadows to rather mesic sites at middle elevations. In the latter regard, we have found the species in the edges of cattail (*Typha* sp.) marshes east of Grants and at Apache Creek, where this was the only vole taken. At Centerfire Bog, *M. mexicanus* was not found in such mesic sites; instead these were occupied by *M. montanus arizonensis*, while *M. mexicanus* occurred in drier graminoid-forb areas, fringing the wettest sites.

We did not undertake a close examination of possible geographic variation in *M. mexicanus* from New Mexico, as this has been addressed by Findley and Jones (1962) and is under study by Hoffmeister (*in litt.*). However, we did note a peculiarity in the dental patterns of some *M. mexicanus* specimens from the upper San Francisco River drainage. In nine of our 48 specimens (18.8%), we found a well to moderately developed posterior loop on M2. This initially caused some confusion in specimen identification. However, in their reddish coloration and short tails, the specimens showing this loop are otherwise typical of *M. mexicanus*.

***Microtus longicaudus* (Merriam)**

This species occurs in the higher uplands almost statewide in New Mexico. However, it appears to be absent from several outlying areas, including the Animas, Guadalupe, Pinos Altos, San Mateo, Magdalena, and Datil mountains (Findley *et al.* 1975). It was, therefore, a matter of considerable interest to find the species on Sierra Grande, Union County, during the course of our surveys there in 1976. We collected three specimens on 1-2 July and 22 September, in open woodlands of blue spruce (*Picea pungens*) and aspen

(*Populus tremuloides*). There this species was outnumbered in traps by *M. mexicanus*. This locality is about 100 km north-northeast of the Cimarron area, the nearest previously known site for *M. longicaudus*.

***Microtus ochrogaster* (Wagner)**

It was a matter of some surprise when Rowlett (1972) reported taking this prairie species at Philmont Scout Camp, Colfax County, in northeastern New Mexico in 1968. Until now, that occurrence represented the only published record from the state, although we later learned that Woodrow Goodpaster took specimens in the same general area in 1975 and 1977 (Donald Hoffmeister *in litt.*). As a consequence of its apparently restricted range and probably vulnerability, *M. ochrogaster* was listed as endangered in New Mexico by the Game and Fish Department in 1975 (Regulation No. 563). Subsequently, the Department began studies to determine more about the status of this species in the state, an investigation that led to its being delisted in 1979.

Surveys conducted by the Department in the period 1976-1978 revealed that *M. ochrogaster* persisted at Philmont Scout Camp and that it occurred elsewhere in Colfax County. It was also found in Mora County, where two specimens were taken near Wagon Mound on 25-26 October 1976 by Conway. In Colfax County, collections included two specimens from 8 km east and 3 km south of Cimarron on 6 May 1977; two from the U U Bar Ranch, 1.5 km east of Miami Lake on 6 May 1977; and a specimen from Springer on the Cimarron River on 10 March 1978. Surveys elsewhere failed to yield the species, which appears to be restricted in New Mexico to the uppermost Canadian River Basin.

Habitat use by *M. ochrogaster* populations in New Mexico is variable. For example, we have taken the species in fairly tall and rather rank stands of grasses and forbs, in dense meadow-like areas, in wet graminoid marshland, and in saline *Juncus* flats. Where the species occurs with *M. pennsylvanicus*, we have seen evidence both for and against habitat-partitioning (see *M. pennsylvanicus* account). We have not taken *M. ochrogaster* with any species other than *M. pennsylvanicus*, but Hoffmeister (*in litt.*) reports that Goodpaster took the former and *M. mexicanus* together in roadside vegetation at a locality 4 miles (6.5 km) south and 2 miles (3 km) west of Cimarron.

Rowlett (1972) and Findley *et al.* (1975) did not address the subspecific status of *M. ochrogaster* in New Mexico. However, Severinghaus (1976) assigned this population to *M. o. haydenii* (Baird), the central and southern Great Plains race of the species (type locality: Ft. Pierre, Stanley County, South Dakota). Severinghaus' concept of this race includes *M. o. taylori* (type locality: 0.5 mile [or 0.8 km] north of Fowler, Meade County, Kansas), which was characterized by its describers as being larger and darker than *M. o. haydenii* (Hibbard and Rinker 1943). In a preliminary study of geographic variation in *M. ochrogaster* in the central and southern Great Plains, Conway

(ms) found that topotypical specimens of *M. o. taylori* average darker than most populations assigned to *M. o. haydenii* and that New Mexico specimens also tend to be dark. However, these southern populations intergrade in this character with more northern ones through Colorado. In addition, most mensural characters, including both standard and cranial, show either clinal or mosaic patterns of intergradation. Under the circumstances, we follow the subspecific treatment of Severinghaus (1976) — pending more detailed analysis of the situation.

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